REMARKS

Claims 1-4, 8-13 and 20 are pending in the application. Claim 20 is currently amended. Claims 14-19 and 21-34 have been previously withdrawn without prejudice. Claims 5-7 have been previously cancelled.

Claim 20 has been amended to recite that the machine readable code is stored on machine readable media. Support for this amendment can be found in the original Claim 21 which recites a "machine readable form." No new matter has been introduced by these amendments.

I. Claim Rejections – 35 U.S.C. §101

Claim 20 stands rejected under 35 U.S.C. § 101 as being drawn to non-statutory subject matter. The Examiner maintains that the term "machine readable code" does not exclude information in a signal. Applicant has amended Claim 20 to recite that the machine readable code is stored on machine readable media. Withdrawal of the rejection is respectfully requested.

II. Claim Rejections – 35 U.S.C. §103 over Qiu in view of Yuhara and Rutherford.

Claims 1, 2, 4, 8-13 and 20 stand rejected under 35 U.S.C. §103(a) as being obvious over Qiu et al. (Journal of Nematology, 1997, Vol. 29, 523-30) ("Qiu" hereinafter), in view of Yuhara, Res. Bull. Hokkaido National Agriculture Experiment Station, 1975, No. 111, p91-100; Japanese translation document ("Yuhara" hereinafter), and Rutherford, Journal of Chemical Ecology, 1998, Vol. 24, No. 9, p1447-63 ("Rutherford" hereinafter). Applicant respectfully disagrees.

Obviousness is a question of law based on underlying factual inquiries. The factual inquiries (also known as the "Graham factual inquiries") to be performed by the Examiner are as follows:

    (1)   Determining the scope and content of the prior art;

    (2)   Ascertaining the differences between the claimed invention and the prior art; and

    (3)   Resolving the level of ordinary skill in the pertinent art.

Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc., Federal Register, Vol. 72, No. 195, 57526-35, 57526 (October 10, 2007)("Examination Guidelines" hereinafter). Once the Graham factual inquiries are resolved, the Examiner must determine whether the claimed invention would have been obvious to one of ordinary skill in the art. Prior art is not limited just to the references being applied, but includes the understanding of one of ordinary skill in the art. Although the prior art reference (or references when combined) need not teach or suggest all the claim limitations, the Examiner must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art. *Id.* 57528.

The instant application claims a method for <u>predicting</u> the capability of a soybean sample to resist soybean cyst nematode using a spectrometer. As detailed in the instant Specification, uninfected soybean samples are scanned using a spectrometer under a spectrum within the infrared range. The result of such a scan is compared with a predictive model developed using an infrared scan of soybean samples with known SCN resistance or susceptibility. One important limitation of claim 1 is the term "predict" which means to declare or to indicate in advance. Thus, claim 1 requires that the method can be used to foretell whether a given soybean sample is resistant or susceptible to SCN infection.

As explained in the Response filed February 4, 2009, Qiu does not teach or suggest that spectra scan of soybean samples can be used to <u>predict</u> the susceptibility of the soybean plant that is originated from the soybean sample. Qiu never teaches that resistant and susceptible soybean strains exhibit different levels of chitinase before infection or infestation. *See* Fig. 1A on page 526 of Qiu, showing that the chitinase activities <u>remain the same </u>when no *Meloidogyne* is used to infect the resistant cultivar and susceptible cultivar. Qiu further discloses that resistant cultivar and susceptible cultivar only begin to show differences in chitinase activity <u>3 days after infestation</u>.

More importantly, Applicant's claims recite the limitation of soybean cyst nematode (SCN), which is not taught or suggested in Qiu. The root-knot nematode (*Meloidogyne incognita*) disclosed in Qiu and the SCN (*Heterodera glycines Inchinohe*)

of the present claims belong to different genera of nematodes and may have different modes of infection on different hosts. *See, e.g.* paragraph 7 of the present specification. Just because a soybean plant is resistant to one species of nematode does not mean that it is necessarily also resistant to another nematode species.

Although Rutherford relates to a method for predicting sugarcane resistance to certain stalk borers, sugarcane is not soybean, and stalk borer is different from soybean nematode. Just because a method can be used to predict sugarcane resistance to certain stalk borers does not mean that the same method can be applied to predict soybean resistance to SCN. Rutherford never mentions or suggests that its method for predicting sugarcane resistance to stalk borer can be modified to predict soybean resistance to SCN.

The Examiner has added a new reference, Yuhara, in the Office action dated July 10, 2009. However, the addition of Yuhara does not cure these defects of Qiu and Rutherford as set forth above.

Yuhara teaches a method to detect existing plant injury caused by soybean nematode. *See e.g.*, page 91 of the original Yuhara reference, or lines 17-21 on page 2 of the translated document provided by the Examiner. Yuhara teaches using infrared color films that form an image when exposed to infrared light. *See* lines 20-23 on page 3 of the translated document. Yuhara further teaches using different filters to capture multispectral images of the soybean crops at a distance, for example, from an airplane. *See* lines 1-11 on page 4 of the translated document. Yuhara fails to teach or suggest that infrared picture of soybean crops can be used to predict soybean resistance to SCN. To take pictures of a field of plants that have been infected by a pathogen and determine the severity of the infection is a process of assessing the damage, but not predicting whether the plants are resistant to the infection.

As explained above, the term "predict" requires that the determination be made in advance, not after the facts. Yuhara never teaches or suggests taking infrared picture of an uninfected soybean plant and determine whether such a plant would be resistant to SCN infection if it were inoculated with SCN. Yuhara never shows that SCN resistant soybean plants would look any different from SCN susceptible soybean plants on an infrared picture before the plants have been infected by SCN. Such an observation would be required if the infrared photography of Yuhara were to be used to predict SCN

susceptibility. On the contrary, the Yuhara methodology is based on the observation that soybean plants <u>that have been infected by SCN</u> appear different from soybean plants that have not been infected. Normally, such a difference can be readily discerned by an experienced farmer during a close-up examination of the plants. The Yuhara method is interesting in that it employed infrared photography to take aerial pictures of the entire field from high above and was able to tell which area of the field has been more severely infected by the pathogen. Taken together, the most important difference between Yuhara and Applicant's methodology is that Yuhara's methodology is only applicable after SCN infection has occurred and can be used in detecting SCN infection, whereas Applicant's claimed invention is useful in predicting SCN susceptibility before any SCN infection has occurred.

The Examiner asserted that Applicant's previous "arguments are directed to features (i.e. uninfected samples or predicting SCN resistance in future plants grown from assayed seed) that are not recited in the instant claims." Page 8 of the instant Office Action dated July 10, 2009. Applicant respectfully disagrees. During patent examination, "the words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification. *In re* Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) and MPEP Section 2111.01. As explained above, claim 1 recites the term "predicting" which means to tell in advance. To predict the SCN susceptibility of a soybean sample means to examine said sample and tell whether it would be resistant to SCN infection without having to infect the soybean sample with SCN. Examining an SCN-infected soybean sample to tell whether it has been infected by SCN is "detecting," NOT "predicting."

The Examiner has acknowledged that Qiu does not specifically teach predicting SCN resistance based on comparing assay spectra and a predictive model." Page 5 of the Office Action dated July 10, 2009. As explained above, Yuhara does not teach or suggest predicting SCN resistance of a soybean sample. Although Rutherford teaches predicting resistance to a plant pathogen, the plant and the pathogen in Rutherford are different from those of the instant invention.

Thus, neither Qiu, nor Yuhara, nor Rutherford, either alone or in combination, teaches or suggests that spectroscopic scan of a soybean sample can be used to predict the

relative SCN susceptibility of a soybean sample. The Examiner has not carried the burden to establish how common knowledge or the combined teaching of Qiu, Yuhara, and Rutherford would have led one of ordinary skill in the art to develop a methodology using spectroscopic scan of a soybean sample and a predictive model to predict whether said sample is SCN resistant or not. In fact, by showing that the chitinase activities are similar between the resistant cultivar and susceptible cultivar prior to or at the time of infestation, Qiu teaches away from the instant invention by suggesting to one of skills in the art that chitinase activity is not a good indicator for predicting susceptibility. Taken together, the claimed invention is not obvious over the cited references and withdrawal of the obviousness rejection is respectfully requested.

III.   Claim Rejections – 35 U.S.C. §103 over Qiu in view of Yuhara and Rutherford, Borggaard and Marek.
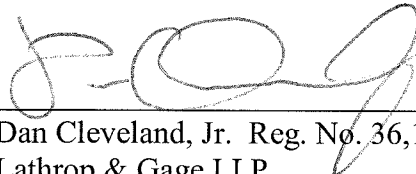
Claims 1-4, 8-13 and 20 stand rejected under 35 U.S.C. §103(a) as being obvious over Qiu in view of Yuhara and Rutherford, and further in view of Borggaard et al. (Anal. Chem. 1992, 64:545-51) ("Borggaard") and Marek et al. (Crop Sci., 2000, vol. 40, p713-16) ("Marek" hereinafter). Applicant respectfully disagrees.

The Examiner relies on Borggaard to provide support for the neural networks for optimally interpreting NIR spectra. The Examiner further relies on Marek to provide support for assaying the chitinase activity in a plant seedling sample by using NIR spectroscopy. Borggaard and Marek do not cure the defects of Qiu, Yuhara and Rutherford, as explained above. This is so because at the time of the present invention, nothing in the cited references or in the common knowledge would suggest to one of skill that chitinase would be a reliable indicator for predicting SCN susceptibility of a given soybean sample. In fact, as mentioned above in Section II, the cited references, if anything, teach away from the instant invention by suggesting to one of skill in the art that there is no significant difference in chitinase activities between resistant and susceptible cultivar prior to infestation. Therefore, because Applicant's claimed invention is not obvious over the cited references, withdrawal of the obviousness rejections is respectfully requested.

For the foregoing reasons, Applicant's attorney respectfully solicits a Notice of Allowance. Applicant believes no additional fees are due at this time. However, if any fees are deemed necessary in connection with this filing, the Commissioner is hereby authorized to charge deposit account No. 12-0600.

Respectfully submitted,

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